

CATEGORIZING CRUISE LINES IN THE NORTH AMERICA MARKET BY PASSENGER  
PERCEIVED EXPERIENCE

A Thesis

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By

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## **ABSTRACT**

Modern leisure cruising is one of the fastest-growing forms of international tourism. Academic researchers have studied leisure-cruise consumers, but there is less research on the cruise industry, in particular on the structure of the industry. For example, the only method used for categorizing cruise lines is based on price and positioning strategies. This study takes a data-driven approach and proposes a new means for categorizing cruise lines by cruiser perceived experience. Using JD Power customer satisfaction data collected from 3003 cruisers, the seven largest seven cruise lines in the North America market are clustered into three categories based on cruiser specific experiences. The categories show significant differences in cruiser experience. Crosstab analyses shows that the categories are also associated with the reasons that consumers select specific cruise lines. Furthermore, for different cruise line categories, the importance of experience components and the relationship between cruiser experience and loyalty are different.

## BIOGRAPHICAL SKETCH

Yiwei Li was born in Luxi, a small, remote, yet peaceful town in western Hunan province in South China. His grandmother had operated a local motel and restaurant for 20 years. Brought up in such a family, he developed an interest in the hospitality industry since his early childhood. After graduating from Central University of Finance and Economics and getting his Bachelor of Business Administration degree in Beijing in 2012, he was very fortunately admitted to the School of Hotel Administration at Cornell University, the best hotel school in the world, and had a chance to systemically learn about hospitality management.

Yiwei has great passion for academic research. Under the guidance of his advisors in Cornell University, he gained a profound understanding of *experiential marketing* and grasped key advanced quantitative research methods. He also obtained other cutting-edge marketing and statistics knowledge within the short two years. After graduation, he will continue studying as a Ph.D. student and will follow his dream of becoming a university faculty member in future.

*This work is dedicated to*  
*my parents, who always love me and generously support me,*  
*and my advisors, who always motivate and enlighten me.*

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## **Introduction**

Modern cruising is leisure travel on a floating resort—far more than just a means of transportation to vacation destinations (Kwortnik, 2006; Dowling, 2006; Isemo, Rosen and Svensson, 2008). Although cruise ships first appeared in the Europe market as early as the 1880s, the modern cruise industry came into being 80 years later in the 1960s, though the industry's growth rate was fairly low for another two decades (Cartwright and Baird, 1999). Rapid industry development emerged in the 1980s and boomed with the experience economy of the late 1990s (Pine and Gilmore, 1998; Schmitt, 1999). Since then, the industry in North America and Europe has seen an average annual growth rates exceeding 8% (CLIA, 2014). Today, the cruise industry is penetrating new markets worldwide, with Asia, South America, Australia, New Zealand, the Middle East, and Africa as growth targets. In 2013, there were approximately 21.6 million passengers who took cruise trips. By the end of 2014, more than 50 cruise lines will operate 292 cruise ships around the world (CLIA, 2014). With such fast growth and great potential, the cruise industry has already become an important segment of leisure and international tourism (Dwyer and Forsyth, 1998).

North America is the largest market for the cruise industry, accounting for more than 60% market share (CLIA, 2014). In 2014, seven out of the biggest ten cruise lines – Carnival (21%), Royal Caribbean (15.8%), Norwegian (9%), Princess (7.5%), Celebrity (4.6%), Holland America

(3.5%), and Disney (3.3%) – operate mainly in this market, while only Costa (7%), MSC (6.3%) and AIDA (4.1%) concentrated more on the European market (CLIA, 2014). Thus, scholarly research on the cruise industry tends to focus on the North America market.

Historically, cruise lines have been categorized based on positioning strategy and price—so, marketer-delineated categories. Such categorization makes assumptions about cruise customers and their preferences that may mask true categories of cruise lines as perceived by the cruisers themselves. While researchers have explored cruiser segmentation (Petrick, 2003, 2004 and 2011; Kerstetter, Yen and Yarnal, 2005), yielding information to help cruise lines to better identify and understand target customers, and then design appropriate services for them, the existing cruise-category structure (i.e., mass market, premium market, luxury market, specialty market) remains unchanged. The main objective of this study is to explore a new method for categorizing cruise lines based on passenger perceived experience. Categorizing by customer perceived experience is expected to better reflect cruisers' evaluations of and satisfaction with the cruise lines. This categorizing method can be used by cruise line marketers to reevaluate whether their market positioning strategies are well implemented.

The second objective of this study is to examine whether customers in the same cruise category have similar reasons for why they chose a particular cruise line. Clarity on this question will provide insight into cruising determinants, which are the factors that attract cruisers to certain

cruise lines (Josiam, Huang, Spears et al., 2009). Knowing the most determinants of different cruise-lines categories can help cruise marketers to design more appropriate services and promotions to attract and better satisfy customers.

The third objective of this study is to explore whether factors such as cruise length, stateroom size, and onboard expenses affect cruiser experience, and thus cruiser satisfaction and loyalty.

Finally, the last objective of this study is to analyze the components of cruiser experience within different cruise line categories to determine the most important experience components. The comparisons can help cruise lines to distinguish which aspects of the cruise experience to emphasize for providing passengers an overall experience.

The following thesis is organized into six sections. In section 1, the literature review, I discuss the key concepts involved in the thesis, including cruiser segments and cruise line categories, customer experience, cruising experience, travel determinants, and customer loyalty. In section 2, research questions, I propose four research questions that cover the aforementioned topics. In section 3, I introduce the methodology applied in this study. I will discuss Sample representativeness, sample size, questionnaire design and statistical methods in detail in this part. In section 4, I will screen the data, conduct multiple statistical analyses, and explain related results. In section 5, I will discuss the implications of this study. In the last section, I will

highlight the contributions as well as the limitations of the study, and propose directions for future research.

## **Literature Review**

### *Segments and Categories of the Cruise Industry*

The cruise industry is basically made up of customers (cruisers) and suppliers (cruise lines). To analyze the customers, we need to know the segments of cruisers. The current segmentation approaches are mostly based on demographics and psychographics. CLIA (2014) found that 76% of cruise passengers in the United States were over 40 years old, 75% had graduate school degrees, 48% earned more than \$100,000 per year, 83% had full-time jobs or were retired, 78% were married, and 91% were white people. Thus, well-educated, well-paid, married, senior white people are the group of travelers who are most likely to take cruise trips. Petrick (2003) segmented cruisers based on price sensitivity and found that cruisers who are less sensitive to price have higher incomes, tend to spend more money on cruise ships, and are more likely to purchase expensive cabins. Petrick (2004) divided cruise repeaters into loyal cruisers and disloyal cruisers, and first-timers into satisfied cruisers and dissatisfied cruisers. He found that loyal cruisers were more satisfied with both tangibles and services and their past experiences, perceived higher value, had higher repeat intentions, and gave more positive word-of-mouth (WOM), and that satisfied first-timers were more pleased with tangibles and services, and had higher perceived value, repeat intentions, and WOM. Elliot and Choi (2011) segmented cruisers by age and found different generations had different cruising motivations. Petrick (2011) also



segmented cruisers by perceived cruise-line reputation. To analyze the suppliers, we need to look into the categories of cruise lines. The current categorization approaches are mostly based on cruise-line market positioning. Kwortnik (2006) summarized four different market positioning strategies for cruise lines: contemporary, premium, luxury, and destination. Among them, luxury cruise lines accounts for less than 5% cruise share, and destination cruise lines' share is even smaller. The contemporary category has the largest share and provides the least expensive services, while the premium category provides more refined services with higher prices.

### *Customer Experience*

With the arrival of the experience era (Pine and Gilmore, 1998; Schmitt, 1999), customers now look for more unique, memorable, extraordinary, and unforgettable experiences (Kozinets, 2002; Curtin 2006; Arnould and Price 1993). In the cruise context, it is an overall experience rather than a clearly defined product that cruisers purchase (Hosany and Witham, 2010).

Although the experience construct has been researched for several decades, the concept is still variously-defined (Caru and Cova, 2003; Gentile, Spiller and Noci, 2007; Ismail et al., 2011).

When used as a noun, experience refers to a sensory, emotional, cognitive, or behavioral outcome obtained from interaction with external stimuli; but when used as a transitive verb,

experience refers more to a dynamic, involving process (Palmer, 2010). Defined in The American Heritage Dictionary of the English Language (2012), experience, as a noun is the feeling of emotions and sensations as opposed to thinking, and as a verb, experience is involvement in what is happening rather than abstract reflection on an event. Holbrook and Hirschman (1982) defined experience as a personal occurrence with important emotional significance founded on the interaction with the consuming stimuli. Arnould and Price (1993) believed an experience to be triggered by a certain event and characterized by a certain level of emotional intensity. Pine and Gilmore (1999) defined experience as an event that engages individuals in a personal way. Schmitt (1999) asserted that experience is a private event that occurs in response to certain stimulations. Gupta and Vajic (2000) stated that an experience occurs when a customer has any sensation or knowledge acquisition resulting from some level of interaction with different elements of context created by service providers. Robinette et al. (2002) thought experience to be the collection of points at which companies and consumers exchange sensory stimuli, information, and emotion. Gentile, Spiller and Noci (2007) conceptualized experience as a dynamic relationship evolution between company and customer. Meyer and Schwager (2007) considered experience as an internal and subjective customer response to any direct or indirect contact with a company. Grewal et al. (2009) and Verhoef et al. (2009) defined experience as customer interaction with business, product or service that provokes reaction. Ismail et al. (2011) claimed that experience is emotions provoked, sensations felt, knowledge gained and skills acquired through active involvement with the firm pre, during and post

consumption. In this study, I treat experience as a noun, and apply Gupta and Vajic's (2000) definition that experience occurs when a customer has any sensation or knowledge acquisition resulting from some level of interaction with different elements of context created by the service providers.

To measure the concept of experience, understanding its dimensionality is key. Based on research within hospitality industries, Otto and Ritchie (1996) identified hedonic, novelty, stimulation, safety, comfort, and interaction as six dimensions of experience. Pine and Gilmore (1999) later narrowed down these dimensions into hedonic, the feeling of escape, peace of mind, and recognition. Schmitt (1999) divided experience into five modules - sense, feel, think, act, and relate. Poulsson and Kale (2004) proposed that personal relevance, novelty, surprise, learning, and engagement are the five key dimensions for designing successful experiences. O'Loughlin, Szmigin, and Turnbull (2004) conceptualized experience as brand experience, functional experience, and relationship experience. Mascarenhas, Kasevan, and Bernacchi (2006) showed that experience encompasses both physical and emotional elements, which differ among customers and contexts. Gentile, Spiller and Noci (2007) established a multidimensional experience structure involving sensorial, emotional, cognitive, pragmatic, lifestyle, and relational components. Brakus, Schmitt, and Zarantonello (2009) specified experience as a combination of sensorial, affective, behavioral, and intellectual experiences. Based on Gupta and Vajic's (2000)

definition of experience and consistent with the multi-dimensional view used by most experience researchers, I define experience as comprised of various ingredient components.

### *Cruise Experience*

Kwortnik (2008) proposed a new definition concerning the cruise experience: shipscape.

Cruisers are affected by ambient, design, and social factors, and they make physiological, emotional, behavioral, experiential, and symbolic responses. Hosany and Witham (2010) proposed education, entertainment, esthetics and escapism as four dimensions for measuring cruising experience. This perspective aligns with Pine and Gilmore's theory (1999). Similar to the contextual theory (Gupta and Vajic, 2000), Hanefors and Mossberg's study (1999) held that tourists' experiences of various ingredients of a package tour make up the overall travel experience and affect his or her perception of service quality of the tour. In this study, I applied the contextual theory of cruising experience and split the experience into seven ingredients: embarkation experience, food experience, stateroom experience, entertainment experience, excursion experience, cost experience, and service experience.

Embarkation experience refers to cruiser-perceived experience of getting on and off the cruise ship. It includes experience with embarkation, using the gangway or tenders to access the ports,

and disembarkation. Queuing design is an important factor that affects embarkation experience.

Because many cruise travelers decide to cruise to enjoy good food (Moscardo and Pearce, 2003), food experience or dining experience, is one of the most important measures of cruise satisfaction (Gibson, 2006; Gorham and Rice, 2007; Ward, 2007). It is affected by various factors such as the cleanliness of dining facilities, food selection, staff hygiene, menu variety, food quality and special cuisine, etc. (Josiam et al., 2009).

Stateroom experience refers to cruiser perception of stateroom design. This aspect is important because cruise passengers usually spend one-third of their time in the stateroom. The room size, room capacity, views, interior designs, balcony, access to the bathroom, and proximity to entertainment facilities all can affect cruisers' perceived stateroom experience.

Entertainment experience is a core experience on cruise ships. It is significantly related to cruiser satisfaction (Hosany and Witham, 2010). More onboard entertainment facilities are added on cruise ships each year, including spa, casino, karaoke, fitness center, shopping malls, pools, cinemas, etc. Most cruise lines also design excursion trips for their customers. Excursion experience can be seen as a special entertainment experience that passengers have off of the cruise ships.

Cost experience is passengers' evaluation of the overall expenditure for their cruise trip. Costs include the cruise fare and onboard expenses, as well as travel costs to the debarkation port, time cost, and energy cost. As costs significantly affect customer expectations (Parasuraman, Zeithaml and Berry, 1991), cost experience should be an important factor influencing cruiser satisfaction and loyalty.

Service experience is another key experience factor for cruisers. It includes cruiser experiences with onboard services and off-board services. Service elements that affect passengers' experience of service, include atmosphere and comfort, personalized services, security, well-trained staff, novel and diverse service items, consistent service level, skillful problem-solving, and service failure compensation, etc. (Josiam et al., 2009).

### *Travel Determinants and Cruising Reasons*

Travel determinants are factors that influence customer choice among competing alternatives (Woodside and Lysonski, 1989; Crompton, 1992; Decrop and Snelders, 2005). In other words, travel determinants are the direct reasons why a cruiser chooses a certain cruise line.

Determinants research is an important branch of consumer behavior research in the tourism industry. There are typically two types of determinants, individual (or internal) factors and

external factors (Hill and Lee, 2000; Swarbrooke and Honrer, 2007). Specifically, Ewing and Haider (1999) pointed out that expert judgment is the most common guide when tourists make choices, and that other destination attributes such as price, wildlife scenery, crowding, travel distance and proximity also affect tourists' decision making. Klenosky, Gengler and Mulvey (1999) found that entertainment, safety, belonging, proximity, cost and travel length are significant tourism determinants. Word of mouth, or recommendations from friends or families, is a key factor that affects destination choice (Allsop, Bassett, and Hoskins, 2007; Beck, 2007; Tham, Croy and Mair, 2013). With the fast development of virtual social networking, positive online reviews are another vital determinant of destination choice (Sparks and Browning, 2011; Wang, 2011; Jacobsen and Munar, 2012). Honrer and Swarbrooke's research on holiday decisions (1996) provided a list of determinant factors of destination choice, including internal factors such as personal motivation, personality, income, health, family and work commitment, past experience, hobbies and interests, existing knowledge of potential destinations, lifestyle, attitudes and opinions, and external factors such as availability, recommendation, political issues, safety, price, costs, branding and reputation, promotions, attraction features and climates.

For the cruise industry, Lu (2001) proposed five external determinant factors: , national environment and safety, entertainment and sports recreation, nature and wilderness, learning opportunity, and modernity and facilities. Pull factors include stateroom, cruise ship recreation amenities, ocean scenery, itinerary, various entertainment programs, reputation, personalization,

and reasonable price. CLIA (2014) summarized the top 10 special factors influencing North American cruiser choices. They are the destination, price, opportunity to relax, unique experience, convenience, particular cruise ship, sightseeing opportunity, availability, cruise length, and programs for family and children.

Constrained by the JD Power's survey, this study involves nine pull factors, including price, reputation, positive review, availability, entertainment, recommendation, itinerary, sail dates and length of trip, and two important individual factors, past experience and casual cruising.

### *Customer Loyalty*

Customer loyalty has been closely studied since the 1980s. Early theories referred to loyalty purely as repeated purchases. However, loyalty is not only behavioral but also attitudinal and situational (Day, 1969; Gremler and Brown, 1996; Oliver, 1997; Chaudhuri and Holbrook, 2001; Uncles et al., 2002; Han et al., 2009; Khan, 2013). Jacoby (1971) defined customer loyalty as a biased purchase process that results from a psychological process. Jacoby and Chestnut (1978) conceptualized customer loyalty as repeat purchase behaviors based on belief acquisition, affect formation, and behavioral intention. Engel and Blackwell (1982) defined customer loyalty as the preferential, attitudinal, and behavioral response towards certain brands expressed over a period



of time by customers. Assael (1992) defined customer loyalty as a favorable attitude toward a brand resulting in consistent purchase of the brand over time. Jones and Sasser (1995) defined customer loyalty as a feeling of attachment to or affection for a company's products, services and people. Gremler and Brown (1996) referred to customer loyalty as the degree to which a customer exhibits repeat purchasing behavior, possesses a positive attitude disposition, and considers the brand when certain need arises. Oliver (1997) defined customer loyalty as a deeply held commitment to re-buy or re-patronize a preferred product/service consistently in the future, thereby causing repetitive same-brand purchasing, despite situational influences and marketing efforts having the potential to cause switching behavior. Bowen and Shoemaker (2003) involved the likelihood of spreading positive word of mouth in a customer loyalty definition. McCain, Jang and Hu (2005) thought customer loyalty resulted from psychological decision-making and an evaluation process. Szczepanska and Gawron (2011) defined customer loyalty as a constant and positive attitude towards a brand.

To measure customer loyalty, the use of a two-dimensional approach is common (Samuelson and Sandvik, 1997; TePeci, 1999; Taylor et al., 2004; Agrawal et al., 2012) and involves measuring both behavioral factors (repeat purchase, purchase proportion, and purchase likelihood, etc.) and attitudinal factors (brand preference, commitment, positive review, brand trust, and satisfaction, etc.). Han, Kwortnik and Wang (2009) measured service loyalty in four parts, cognitive loyalty, affective loyalty, intention loyalty and behavioral loyalty. In this study, restrained by the JD

Power methodology, only two manifest indicators, repeat purchase (behavioral) and positive word of mouth (attitudinal), are selected to measure cruiser loyalty.

## Research Questions

Experience has become an important ingredient of the current economy (Schmitt, 1999). Companies should take customer experience into account when analyzing business success (Schmitt and Simonson, 1997; Pine and Gilmore, 1999; Sundbo and Darmer, 2008). In the modern cruise industry, cruiser experience also plays an important role (Josiam et al., 2009; Hosany and Witham, 2010). Contemporary, premium, luxury, and destination cruise lines have different target customers and design different operational strategies (Kwortnik, 2006), thus providing different experiences to their passengers. Cruisers usually build up their expectations based on cruise lines' market positioning before the trip. However, not all cruise lines can deliver the desired experiences as promoted. In other words, not all cruisers will perceive the cruise experience in the way the service providers designed for them or as they expected. Thus, categorizing cruise lines based on passenger perceived experience can reflect cruise lines' operational effectiveness.

Research Question 1: *Can cruise lines be categorized by cruisers' perceived experience?*

Based on their attitudes, personality, value principles and past experience, tourists usually perceive certain determinants to be more important than other determinants in their vacation choice process (Swarbrooke and Horner, 2007). Passengers taking the same cruise lines may

share similar characteristics, as their destination and cruise line selections can reflect their choice and evaluation criteria. This means that the reasons for selecting cruise lines for a cruiser can depend on which cruise line he or she takes or which cruise line category he or she belongs to. For instance, Petrick (2003) found that price sensitive cruisers who take contemporary cruise lines usually purchase cheap cabins. Price is the most important determinant for them.

Research Question 2: *Are cruising reasons associated with cruise line categories?*

Expenditures, trip length, and stateroom size are important factors that affect cruiser experience and satisfaction (Petrick, 2003; Prosser and Leisen, 2003; Kworntnik, 2008; Josiam et al., 2009). Higher expenses indicate that cruisers are involved in more entertainment activities, thus leading to a better cruising experience. Similarly, as longer cruise trips often involve more leisure and entertainment, passengers who cruise longer may have a better experience. Finally, privacy is important for hospitality customers, thus cruisers usually prefer smaller stateroom size. However, cruisers of different cruise line categories differ in price-sensitivity, travel group size, time availability, etc. The relationship between cruiser overall experience and stateroom size, trip length, and expenses can be different among categories.

Research Question 3: *Does the relationship between cruiser overall experience the stateroom size, trip length and expenses depend on cruise line categories?*

Chang and Chieng (2006) found that creating consistent customer experiences is synonymous with the brand and as a result derives loyalty. Brakus, Schmitt and Zarantonello (2009) revealed that customer perceived experience affects behavioral outcomes both directly and indirectly. Petrick (2004) found that loyal cruisers usually have better experiences than others. But because cruisers traveling with different cruise lines may be diverse in terms of preferences, personality, and habits, how they form an overall evaluation of their cruise experience and consequent loyalty can be very different.

Research Question 4a: *Is the importance of specific experiences to overall experience the same across different cruise lines categories?*

Research Question 4b: *Is the relationship between cruiser overall experience and cruiser loyalty the same across different cruise lines categories?*

## **Methodology**

The main methodology applied in this study was a survey. J.D. Power collected the data in June 2013 by distributing questionnaires to 3003 cruisers who had cruise trips from April 2012 to March 2013. Some systematic sampling problems exist, because only 7 mainstream cruise lines – Carnival, Princess, Holland America, Royal Caribbean, Celebrity, Norwegian, and Disney – were involved in the survey, and respondents were not randomly selected within North America. However, CLIA manual (2014) shows that the seven cruise lines mentioned above made up 64.7% worldwide market share and over 95% share in the North America market. Besides, with a large sample size, the external validity of this study is high. Therefore, the selected sample had good representativeness of the North America cruising market and even the worldwide cruising industry, since 60.2% cruise line passengers worldwide are from the North America market.

### *Questionnaire*

Shown in the appendix, the questionnaire includes 24 questions. The first two questions distinguish which cruise ship the respondents took most recently. The third question measures the length of the trip. The fourth question measures the stateroom size. Question 5 and question 6 measure the information sources and reservation channels used to book the cruise, which is not

of interest in this study. The seventh question measures cruising reasons, followed with question 8 measuring the expense of taking the cruise trip. Questions 9 through 13 are specific questions concerning services, which are not involved in this study. Question 14 distinguishes whether an excursion is included in the trip. Questions 15 through 21 measure cruiser-specific experiences, including embarkation experience, food experience, entertainment experience, cost experience, service experience, excursion experience, and stateroom experience. Question 22 measures cruiser overall experience. The 23rd question is about willingness to purchase again and the last question is about the willingness to engage in positive word-of-mouth.

### *Sample Size*

The sample size is large with 3003 observations. However, not all cases are valid without missing value replacement. In addition, the dataset will be divided into three subsets for multiple regression and SEM analyses. The smallest sample size of the subsets is only 314. SEM usually requires larger samples, because results from small samples can be unreliable. Jackson (2003) suggested that an ideal sample size-to-parameters ratio is 20:1, and that ratios below 10:1 do not yield trustworthy results. There are 17 parameters in total to be estimated in the final SEM model with sample size of 314, which is acceptable. Reviews of published articles involving SEMs showed that the medium sample size to solve SEM problems is 200 (Breckler, 1990; Shah and

Goldstein, 2006). However, a sample size of 200 is too small for complex models where non-normal distribution is a problem (Kline, 2009). Later analyses will show that most variables in this study suffer from non-normality problems even after data transformation. Critical sample size tests in LISREL also reveal that the actual number of observations of each cluster is smaller than the critical N value. Thus, the small sample is a minor limitation of this study.

### *Statistical Tests*

To examine the hypotheses I have proposed in the former section, four kinds of statistical tests will be conducted. First, a K-means cluster analysis will define the clusters among the seven cruise lines. Second, a series of crosstab analyses will reveal whether cruising determinants are associated with cruise line clusters. These tests will also examine whether, for each determinant, there is a linear trend among cruise lines clusters. Third, several multiple regression analyses will be used to determine whether cruise length, expense, and stateroom size are predictors of cruiser experience for all cruise lines clusters. Lastly, a series of structural equation models will be built to find which specific experiences influence cruiser overall experience most for each cruise lines category, and whether the relationships between experience and loyalty are the same across different clusters.



## **Data Screening and Analyses**

### *Variables of Interest*

In the original data set, there are 49 variables in total, but not all variables are of interest in this study. Based on the research questions proposed in the former section, 25 variables were selected to conduct statistical analyses. Among them, 13 are categorical variables, 10 are interval variables, and 2 are ratio variables. To solve the first research question, 8 variables - Cruise Lines, Embarkation Experience, Food Experience, Entertainment Experience, Cost Experience, Service Experience, Excursion Experience, and Stateroom Experience – provide information for conducting K-Means cluster analysis. The seven levels of the variable Cruise Lines will be divided into K clusters, which are the K levels of a new categorical variable that I name as Clusters. The second research question is about the relationship between cruise lines clusters and cruising reasons. Thus I need the new categorical variable, Cluster, and all variables concerning cruising reasons, including Price, Reputation, Past Experience, Positive Review, Availability, Entertainment, Recommendation, Itinerary, Sail Date, Casual Cruising, and Trip Length. Several crosstab analyses will be conducted with these variables. The third research question is to explore the relationship between cruiser overall experience and cruise length, stateroom size, and the onboard expense for each cruise line cluster. The data will be divided into K subsets based on the new categorical variable Cluster.

**Table 1: List of Variables of Interest**

<b>Variable Names</b>	<b>Descriptions</b>	<b>Categories / Scales</b>
Cruise Lines	Which cruise line did you take?	-
Cruising Length	What's the length of your cruising trip?	1-5 days / 5+ days
Price		
Reputation		
Past Experience		
Positive Review	Is price / reputation / past experience /	
Availability	positive review / availability / entertainment /	
Entertainment	recommendation / itinerary / sail date /	Yes / No
Recommendation	casual cruising / trip length a reason for you	
Itinerary	to choose the cruise line?	
Sail Date		
Casual Cruising		
Trip Length		
Stateroom Size	How many people stayed at your stateroom?	1 – 15 (persons)
Onboard Expense	What's your total onboard expense?	1 – 10000 (dollars)
Embarkation Experience		
Food Experience		
Entertainment Experience	How is your embarkation / food /	1 – 10 (1 represents
Costs Experience	entertainment / costs / excursion / service /	unacceptable, 10
Excursion Experience	stateroom / overall experience?	represents
Service Experience		outstanding)
Stateroom Experience		
Overall Experience		
Return	Will you travel again with the cruise line?	1 – 4 (1 is definitely
WOM	Will you recommend the cruise line to others?	not, 4 means definitely will)

The last research question analyzes the importance of the experience components for each cruise line cluster and the relationship between cruiser experience and cruiser loyalty. The data subsets mentioned above will be applied here again. Eight continuous variables will be used as manifest variables to build structural equation models. Embarkation Experience, Food Experience, Entertainment Experience, Cost Experience, Service Experience, Excursion Experience, and

Stateroom Experience will comprise the measurement model of cruiser experience; Return and WOM will comprise the measurement model of cruiser loyalty. Table 1 above introduces all relevant variables.

### *Descriptive Statistics for Raw Data*

Descriptive statistics can summarize and reflect the main features of numerical variables in the sample data. Finding out how variables distribute is the foundation work before conducting further analyses. Before analyzing statistical tests, numerical variables in the data should be screened to avoid NPD problems (Kline, 2011). To examine missing values, outliers and normality problems, the table below gives the valid observation numbers, minimum, maximum, mean, standard deviation, skewness with standard error, and kurtosis with standard error for each numerical variable of interest in this study.

As shown in Table 2, only 1647 out of 3003 respondents provided full information, indicating that only 54.8% of the observations were listwise valid. Thus, missing values are a problem for the data. Specifically, variable *Excursion* has 928 (30.9%) missing values. Since not all cruise lines design excursion trips for their customers, passengers who travel on non-excursion cruise lines are not able to measure their excursion experience. In addition, excursion experience can be

regarded as a part of the entertainment experience. Thus, I deleted the variable *Excursion* from further analyses. The variable *Expense* also has missing values. But those missing values may be inevitable, as people are usually more sensitive to financial-related questions. Missing values of other variables are minor problems, which can be due to random errors. Linear interpolation will be applied to replace missing values for all variables except for *Excursion*.

**Table 2: Descriptive Statistics of the Raw Data**

	N	Min	Max	Mean	SD	Skewness	Kurtosis
Stateroom Size	2965	1	15	2.50	1.283	4.250 (.045)	28.691 (.090)
Expense	2484	1	10000	2404.43	2036.928	1.640 (.049)	2.939 (.098)
Embarkation	3003	1	10	8.34	1.642	-1.337 (.045)	2.262 (.089)
Food	3003	1	10	8.34	1.690	-1.338 (.045)	1.944 (.089)
Entertainment	3003	1	10	8.18	1.710	-1.192 (.045)	1.530 (.089)
Costs	3003	1	10	7.89	1.748	-.880 (.045)	.570 (.089)
Service	3003	1	10	8.57	1.532	-1.407 (.045)	2.446 (.089)
Excursions	2075	1	10	8.12	1.687	-1.103 (.054)	1.276 (.107)
Stateroom	3003	1	10	8.36	1.615	-1.263 (.045)	1.879 (.089)
Overall	3003	1	10	8.45	1.579	-1.466 (.045)	2.717 (.089)
Return	2893	1	4	3.51	.727	-1.579 (.046)	2.358 (.091)
WOM	2927	1	4	3.55	.697	-1.690 (.045)	2.838 (.090)
Valid N	1647						

Note: Valid N is the number of observations without any missing values. *Stateroom Size* and *Expense* are two ratio variables, while all other variables are interval variables. The units and anchors are illustrated in Table 1.

The minimum value of variable *Expense* is 1 dollar, which is implausible. With the industry pricing information, expense below 100 dollars should be seen as a missing values. The range of

*Expense* is 9999 and its standard deviation is 2404.43, much larger than those of other variables, indicating that the distribution of *Expense* is different from the distributions of other variables. Therefore, without variable transformation, analyses involving *Expense* can be instable and inaccurate.

The means of variables *Embarkation*, *Food*, *Entertainment*, *Costs*, *Service*, *Excursion*, *Stateroom*, *Return* and *WOM* are relatively more close to their maximum values, indicating these variables are left skewed. The ratios of skewness and their corresponding standard error of these variables are all smaller than -19.5, also suggesting that left skewness is a problem. For the variables *Stateroom Size* and *Expense*, large positive Z scores of skewness indicate right skewness. According to the histogram of variable *Stateroom Size*, few responses exceed 6. Therefore, values above 6 should be seen as outliers. I replace the values of outliers with 6. The kurtosis Z scores (ratio of kurtosis and its standard error) of all variables are larger than 1.96, indicating that leptokurtic distributions are problems.

### *Variable Transformations*

As pointed out above, larger absolute values of Z scores indicate that skewness and kurtosis commonly exist in the data. In addition, the variable ranges are quite different. Because different

scale ranges can affect the stability and accuracy of some statistical tests, for more robust statistical results, some variables must be transformed. The transformation formulas are shown below, where *Experience* represents variables from *Embarkation* to *Overall*.

$$Stateroom\ Size_{adjusted} = \frac{3 \times (Stateroom\ Size_{raw} - 1)}{5} + 1$$

$$Expense_{adjusted} = \frac{3 \times (\log_{10} Expense_{raw} - 2)}{2} + 1$$

$$Experience_{adjusted} = \begin{cases} 1 & 1 \leq Experience_{raw} \leq 5 \\ 2 & 6 \leq Experience_{raw} \leq 7 \\ 3 & 8 \leq Experience_{raw} \leq 9 \\ 4 & Experience_{raw} = 10 \end{cases}$$

The aims of the variable transformations are 1) to make the ranges of all numerical variables the same and 2) to reduce the absolute values of skewness and kurtosis. As the ranges of the variables *Return* and *WOM* are the smallest, I selected their ranges as the standard, namely to transform ranges of all other variables into 3.

### *Descriptive Statistics for Adjusted Data*

We can see from Table 3 below, no missing values or outliers exist in the data after

transformation. All numerical variables have the same range. Univariate non-normality is still a general problem, as the absolute values of all skewness Z scores and most kurtosis Z scores exceed 1.96. But Kline (2009) pointed out the z-tests are not helpful to check normality for large samples. He proposed interpreting the absolute values of skewness and kurtosis instead. As the absolute values of all skewness are smaller than 3 and those of all kurtosis are smaller than 8, the univariate normality assumption is met in this study. However, as shown in Table 21 later, the multivariate normality assumption is not met. To conclude, when compared with the raw data, the numerical variables in the adjusted data are better distributed. Tests with the adjusted data will be more robust and stable.

**Table 3: Descriptive Statistics of the Adjusted Data**

	<b>N</b>	<b>Min</b>	<b>Max</b>	<b>Mean</b>	<b>SD</b>	<b>Skewness</b>	<b>Kurtosis</b>
Stateroom Size	3003	1	4	1.87	.580	1.664 (.045)	2.826 (.089)
Expense	3003	1	4	2.86	.545	-.440 (.045)	.262 (.089)
Embarkation	3003	1	4	2.97	.855	-.629 (.045)	-.122 (.089)
Food	3003	1	4	2.98	.872	-.671 (.045)	-.124 (.089)
Entertainment	3003	1	4	2.90	.877	-.570 (.045)	-.274 (.089)
Costs	3003	1	4	2.73	.915	-.424 (.045)	-.583 (.089)
Service	3003	1	4	3.09	.832	-.755 (.045)	.128 (.089)
Stateroom	3003	1	4	2.98	.856	-.644 (.045)	-.099 (.089)
Overall	3003	1	4	3.03	.823	-.713 (.045)	.170 (.089)
Return	3003	1	4	3.51	.719	-1.586 (.045)	2.437 (.089)
WOM	3003	1	4	3.55	.692	-1.692 (.045)	2.887 (.089)
Valid N	3003						

Note: the unit of Stateroom Size is no longer person, and that of Expense is no longer dollar.

## Cluster Analyses

The main objective of this study is to categorize cruise lines in the North America market based on customer perceived experience. The assumption is that cruise lines in the same cluster provide similar experience to their customers. Past research showed that the seven cruise lines profiled in the survey can be divided into two groups (Kwortnik, 2006). Carnival, Royal Caribbean, Norwegian and Disney belong to the contemporary group, while Princess, Holland America and Celebrity belong to the premium group. However, we should consider discrepancies in the implementation of market positioning strategies for different cruise lines. Therefore,  $K = 2$  and  $K = 3$  are both tried for K-means cluster analyses. Empirical results in Table 4 suggest that  $K = 3$  is the better option.

**Table 4: Cluster Membership and Distance when  $K = 2$  and  $K = 3$**

Case Number	Cruise Lines	K = 2		K = 3	
		Cluster	Distance	Cluster	Distance
1	Disney	1	.000	1	.000
2	Royal Caribbean	2	.198	2	.121
3	Celebrity	2	.093	2	.093
4	Holland	2	.181	2	.107
5	Norwegian	2	.078	3	.095
6	Princess	2	.139	3	.070
7	Carnival	2	.220	3	.120

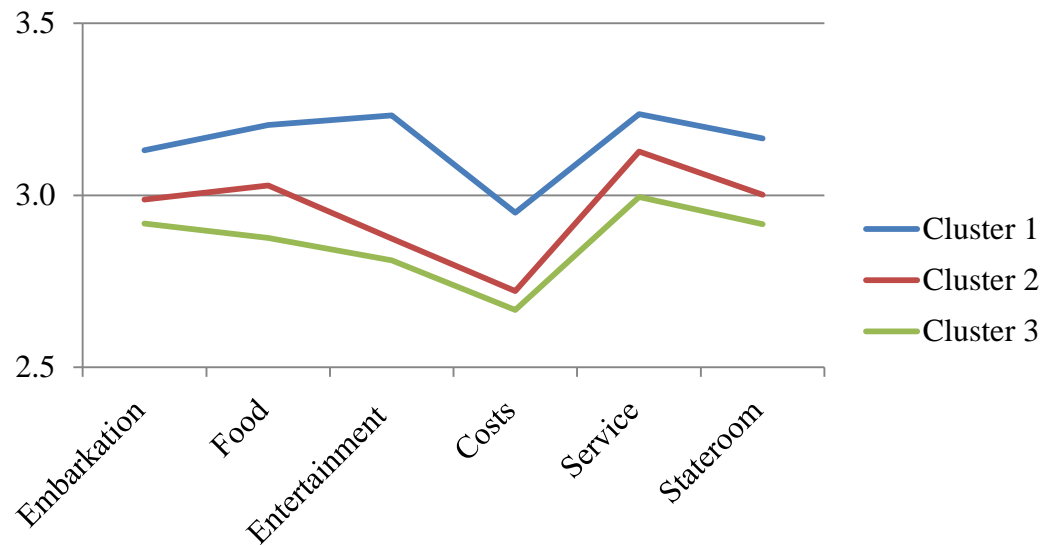
When  $K = 2$ , the cluster with the least number of cases only involves one cruise line, while the cluster with most number of cases contains 6 cruise lines. The ratio of number of cases between



them is 0.167, much smaller than that when  $K = 3$ , which is 0.333. In addition, the maximum distance when  $K = 2$  is 0.220, larger than that when  $K = 3$ , which is 0.121.

**Table 5: Means of Each Cluster**

	Cluster		
	1	2	3
Embarkation	3.131	2.990	2.939
Food	3.204	3.058	2.897
Entertainment	3.232	2.898	2.808
Costs	2.949	2.728	2.679
Service	3.236	3.152	3.014
Stateroom	3.166	3.001	2.945



**Figure 1: Comparison of Experiences Means by Cluster**

From Table 5 or Figure 1, we can see that the means of experiences of cluster 1 are the largest and those of cluster 3 are the smallest. Therefore, it is reasonable to define that, among the seven

cruise lines, there are three clusters with different cruiser perceived experience levels – high experience cruise lines (Cluster 1), medium experience cruise lines (Cluster 2), and low experience cruise lines (Cluster 3).

**Table 6: ANOVA of Overall Experience by Cluster**

	<b>Sum of Squares</b>	<b>df</b>	<b>Mean Square</b>	<b>F</b>	<b>Sig.</b>
Between Groups	21.590	2	10.795	16.112	.000
Within Groups	2010.013	3000	.670		
Total	2031.603	3002			

**Table 7: Tukey HSD's Multiple Comparisons of Overall Experience by Cluster**

<b>I Clusters</b>	<b>J Clusters</b>	<b>Mean Difference</b>	<b>Std. Error</b>	<b>Sig.</b>	<b>95% Confidence Interval</b>	
		<b>I-J</b>			<b>Lower Bound</b>	<b>Upper Bound</b>
Low	Medium	-.117 <sup>*</sup>	.032	.001	-.19	-.04
	High	-.263 <sup>*</sup>	.051	.000	-.38	-.14
Medium	Low	.117 <sup>*</sup>	.032	.001	.04	.19
	High	-.146 <sup>*</sup>	.052	.014	-.27	-.02
High	Low	.263 <sup>*</sup>	.051	.000	.14	.38
	Medium	.146 <sup>*</sup>	.052	.014	.02	.27

\*. The mean difference is significant at the 0.05 level.

To ensure the accuracy of this clustering method, I measure the significance of the differences in overall experience among clusters. Table 6 shows that the F value is 16.112 with  $p = 0.000$ , indicating that the overall experience means of the three clusters are significantly different. To compare all pairwise means, I further conduct Tukey's tests. In Table 7, all p values are smaller than 0.05, indicating that the differences between any two clusters are all significant. These tests all suggest this clustering method is statistically valid.

## Crosstab Analyses

The objective of this analysis is to explore whether cruisers in different clusters have different reasons for selecting cruise lines. I will measure the association between cruising reasons and clusters with different approaches. Based on all categorical variables related with cruising reasons, a two-way crosstab is developed and shown below. In this table, cruising reasons is the dependent variable and cluster is the independent variable. The numbers in cells represent the counts of the reasons being checked by cruisers in the clusters. We can see that 3003 respondents had checked 10524 answers in total, indicating that the average number of reasons that affect passengers' cruise lines selection is around 3.5. Among the 11 reasons involved in the study, price, reputation, past experience, itinerary, sail dates and trip length are popular with over 1000 responses.

**Table 8: Counts of Cruising Reasons by Cluster**

<b>Cruising Reasons</b>	<b>Clusters</b>			<b>Total</b>
	<b>Low</b>	<b>Medium</b>	<b>High</b>	
Price	825	572	125	1522
Reputation	410	458	149	1017
Past Experience	578	500	101	1179
Positive Review	324	278	107	709
Availability	467	349	90	906
Entertainment	353	267	163	783
Recommendation	192	187	40	419
Itinerary	573	507	65	1145
Sail Dates	569	448	74	1091
Casual Cruising	412	184	83	679
Trip Length	529	449	96	1074
<b>Total</b>	<b>5232</b>	<b>4199</b>	<b>1093</b>	<b>10524</b>

The association test results in Table 9 shows that both the LR chi-square value and the Pearson chi-square value are large with p values smaller than 0.001. This number indicates that cruising reasons are significantly associated with cruise line clusters. The reasons for why consumers select cruise lines are significantly different for cruisers in different clusters.

**Table 9: Association Test of Cruising Reasons by Cluster**

<b>Tests</b>	<b><math>\chi^2</math></b>	<b>P value</b>
Likelihood ratio chi-square test	261.607	< 0.001
Pearson chi-square test	273.123	< 0.001

The column percentages in Table 10 suggest that cruisers taking low experience cruise lines cruise because of price, past experience and sail dates, while those taking high experience cruise lines cruise because of reputation, positive reviews and entertainment. Considering price, 15.77% of cruisers in the low experience cluster select the cruise companies because of price, while only 11.44% cruisers in the high cluster think price affects their selection. In other words, cruisers in the low experience cluster are more likely to make their cruise decision based on price.

The last column of Table 10 gives the chi-square value for each specific reason. Availability, recommendation, and trip length are not significantly related with clusters as their corresponding chi-square values are small. To confirm the conclusion, I conduct association tests by treating each cruising reason as the dependent variable respectively for 11 times. According to Table 11,

LR and Pearson chi-square tests also show that availability, recommendation, and trip length are not associated with cruise lines clusters, because the chi-square values are small.

**Table 10: Contingency Table of Cruising Reasons by Cluster**

<b>Count (Column %)</b>	<b>Clusters</b>			<b>Sum <math>\chi^2</math></b>
	<b>Low</b>	<b>Medium</b>	<b>High</b>	
Price	825 (15.77)	572 (13.62)	125 (11.44)	15.14*
Reputation	410 (7.84)	458 (10.91)	149 (13.63)	42.61*
Past Experience	578 (11.05)	500 (11.91)	101 (9.24)	5.73*
Positive Review	324 (6.19)	278 (6.62)	107 (9.76)	17.5*
Availability	467 (8.93)	349 (8.31)	90 (8.23)	1.22
Entertainment	353 (6.75)	267 (6.36)	163 (14.91)	92.02*
Recommendation	192 (3.67)	187 (4.45)	40 (3.66)	3.91
Itinerary	573 (10.95)	507 (12.07)	65 (5.95)	29.98*
Sail Dates	569 (10.88)	448 (10.67)	74 (6.77)	15.31*
Casual Cruising	412 (7.87)	184 (4.38)	83 (7.59)	46.51*
Trip Length	529 (10.11)	449 (10.69)	96 (8.78)	3.19
Total	5232 (100)	4199 (100)	1093 (100)	273.12*

Next, I treat cluster as an ordinary variable, coding the low cluster as 1, the medium cluster as 2, and the high cluster as 3. The larger the values, the higher the cruiser-rated experience is. Thus, by changing the variable type, I indirectly take the experience means into account. With more information, the following Cochran Armitage trends tests are more powerful. Shown in the last column of Table 11, negative Z scores suggest that cruisers in the low clusters are more likely to be affected by specific reasons, while positive Z scores suggest cruisers in the high clusters are more likely to be affected by specific reasons. If the absolute values are larger than 1.96, the trends are statistically significant. Thus, besides availability, recommendation, and trip length, past experience is also not linearly associated with clusters. We can also see that that cruisers taking low experience cruise lines care more about price, itinerary, sail dates, and causal cruising, while those taking high experience cruise lines care more about reputation, positive reviews, and entertainment.

**Table 11: Association Tests of Specific Reasons by Clusters and Trends Tests**

<b>Specific Cruising Reasons</b>	<b>LR <math>\chi^2</math></b>	<b>Pearson <math>\chi^2</math></b>	<b>Cochran Armitage Z</b>
Price	18.093**	17.699**	-4.207**
Reputation	46.144**	47.170**	6.863**
Past Experience	6.655*	6.454*	-0.618
Positive Review	16.970**	18.768**	3.599**
Availability	1.335	1.335	-1.076
Entertainment	81.340**	99.416**	6.558**
Recommendation	4.028	4.073	-0.511
Itinerary	38.258**	33.638**	-2.703**
Sail Dates	18.964**	17.084**	-3.155**
Casual Cruising	52.076**	49.715**	-3.680**
Trip Length	3.645	3.553	-0.511

## Multiple Regression Analyses

The next analysis explores the relationship between cruiser overall experience and stateroom size, trip length and cruising expense for each cluster. All analyses are data-driven.

Without considering the cluster information, an overall model is first built, where *Overall Experience* is the outcome variable and *Cruise Length*, *Stateroom Size* and *Expense* are the predictor variables. To find out the best statistical model, I tried all possible two-way and three-way interaction terms. Empirical results suggest that only the two-way interaction between trip length and stateroom size is significant, indicating that the relationship between overall experience and stateroom size depends on how long the trip is.

**Table 12: ANOVA of the Overall Multiple Regression Model**

	Sum of Squares	df	Mean Square	F	Sig.
Model	19.818	4	4.954	7.383	.000 <sup>*</sup>
Error	2011.785	2998	0.671		
Total	2031.603	3002			

**Table 13: Parameter Estimates of the Overall Multiple Regression Model**

Term	Estimates	Std. Error	t	P value
Intercept	2.532	0.107	23.73	<.001 <sup>*</sup>
Length	0.299	0.105	2.85	.004 <sup>*</sup>
Stateroom Size	0.091	0.039	2.33	.020 <sup>*</sup>
Length*Stateroom Size	-0.122	0.052	-2.33	.020 <sup>*</sup>
Expense	0.098	0.029	3.37	.001 <sup>*</sup>

The p value of lack of fit test of the model is larger than 0.05, suggesting that the model has good fit. The model test shown in Table 12 shows that the model is significant, as the F value is large with a p value that equals 0.000. Shown in Table 13, all parameter estimates are statistically significant. The negative interaction estimate illustrates that larger stateroom size is preferred in short cruise trips while smaller stateroom size is preferred in long cruise trips. This finding can be explained as big groups usually select short cruise trips, while small groups usually take long cruise trips. The positive estimate of *Expense* suggests that the more cruisers spend on cruise ships, the better their experiences are. This finding is reasonable because higher expense usually indicates that the cruiser is involved in more entertainment activities and thus has more fun.

Next, the data set is divided into three data subsets by clusters. The model is then applied respectively to all data subsets. ANOVA tables below demonstrate that all models are significant, as all p values of F tests are smaller than 0.05. But the small p value in the lack of fit test for the medium cluster model suggests that this model is not well fit.

**Table 14: ANOVA of Multiple Regression Model for the Low Cluster**

	<b>Sum of Squares</b>	<b>df</b>	<b>Mean Square</b>	<b>F</b>	<b>Sig.</b>
Model	8.325	4	2.081	2.990	.018*
Error	1043.281	1499	0.696		
Total	1051.606	1503			



**Table 15: ANOVA of Multiple Regression Model for the Medium Cluster**

	Sum of Squares	df	Mean Square	F	Sig.
Model	10.224	4	2.556	3.949	.003 <sup>*</sup>
Error	763.787	1180	0.647		
Total	774.012	1184			

**Table 16: ANOVA of Multiple Regression Model for the High Cluster**

	Sum of Squares	df	Mean Square	F	Sig.
Model	6.767	4	1.692	2.943	.021 <sup>*</sup>
Error	177.628	309	0.575		
Total	184.395	313			

Although all models fit the data, the parameter estimates of each model are not all significant. Specifically, for the low experience model, shown in Table 17, *Expense* is no longer significant, indicating that the expenses of passengers on low experience cruise lines do not make a difference for their cruise experience. This may be because they are more price-sensitive. The estimate of the interaction term is still significant and negative, suggesting that, on low experience cruise lines, larger stateroom size is preferred in short cruise trips while smaller stateroom size is preferred in long cruise trips.

**Table 17: Parameter Estimates of Multiple Regression Model for Low Cluster**

Term	Estimates	Std. Error	t	P value
Intercept	2.643	0.156	16.97	<.001 <sup>*</sup>
Length	0.410	0.150	2.73	.006 <sup>*</sup>
Stateroom Size	0.084	0.057	1.48	.140
Length*Stateroom Size	-0.164	0.076	-2.14	.032 <sup>*</sup>
Expense	0.032	0.043	0.73	.464

**Table 18: Parameter Estimates of Multiple Regression Model for Medium Cluster**

<b>Term</b>	<b>Estimates</b>	<b>Std. Error</b>	<b>t</b>	<b>P value</b>
Intercept	2.443	0.180	13.60	<.001 <sup>*</sup>
Length	0.215	0.183	1.18	.239
Stateroom Size	0.106	0.070	1.52	.130
Length*Stateroom Size	-0.088	0.092	-0.95	.341
Expense	0.137	0.047	2.92	.004 <sup>*</sup>

**Table 19: Parameter Estimates of Multiple Regression Model for High Cluster**

<b>Term</b>	<b>Estimates</b>	<b>Std. Error</b>	<b>t</b>	<b>P value</b>
Intercept	2.658	0.260	10.21	<.001 <sup>*</sup>
Length	0.526	0.285	1.85	0.066
Stateroom Size	0.004	0.082	0.06	0.954
Length*Stateroom Size	-0.180	0.122	-1.47	0.141
Expense	0.176	0.073	2.42	0.016 <sup>*</sup>

However, for medium and high experience cruise lines, as shown in Table 18 and 19 above, *Stateroom Size*, *Length* and the interaction term between them are no longer significant. Only *Expense* is significantly related with cruiser experience. The estimates in both models are positive, suggesting that the more money cruisers in the medium and high clusters spend, the better their experiences are. The estimate in the high cluster model is larger than that in the medium cluster model, indicating that the positive relationship between expense and cruiser experience is even stronger on high experience cruise lines.

#### *Reliability and Convergent Validity*

Before conducting structural equation models, I test the reliability and convergent validity of the two measures for each data subset. The accepted rule of thumb for describing internal consistency (Kline, 2000; George and Mallery, 2003) defines Cronbach's alpha value greater than 0.7 indicates good reliability. Hair et al. (2010) proposed that CR greater than 0.7 indicates good reliability, and that the data has good convergent validity if CR is larger than AVE or AVE is greater than 0.5. As shown in Table 20 below, all Cronbach's Alpha values are larger than 0.8, all CR are bigger than 0.9, and all AVE are above 0.6. Therefore, the reliability and convergent validity are good for all models.

**Table 20: Cronbach's Alpha, CR, and AVE**

<b>Data Sets</b>	<b>Measures</b>	<b>Cronbach's Alpha</b>	<b>CR</b>	<b>AVE</b>
Low Cluster	Experience	0.891	0.918	0.649
	Loyalty	0.808	0.913	0.839
Medium Cluster	Experience	0.889	0.916	0.645
	Loyalty	0.810	0.914	0.841
High Cluster	Experience	0.910	0.932	0.698
	Loyalty	0.868	0.938	0.884

### *Structural Equation Models*

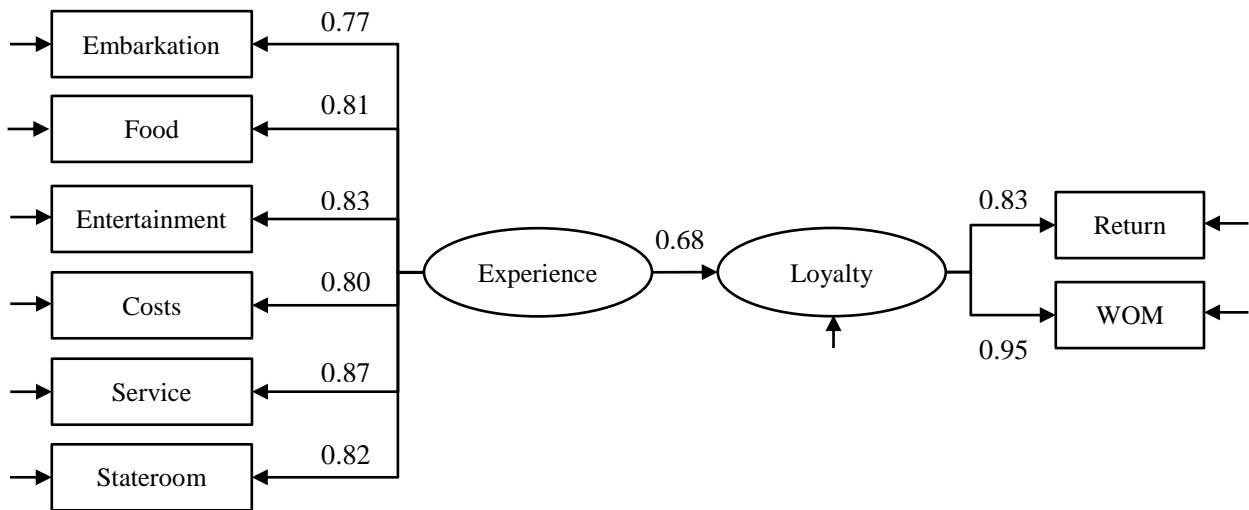
The last two objectives of this study are first to analyze the importance of each component of cruiser experience for different cruise lines categories, and then to test the relationship between cruiser experience and cruiser loyalty. Structure equation models were built to address these two

objectives. The measurement models of cruiser experience will solve the first problem, and the structural regression models will answer the second problem. The key is to get the standardized estimates. First I checked all assumptions and find that multivariate normality tests reject the normality assumption. Thus, Satorra-Bentler scaled chi-square should be applied for SEM models.

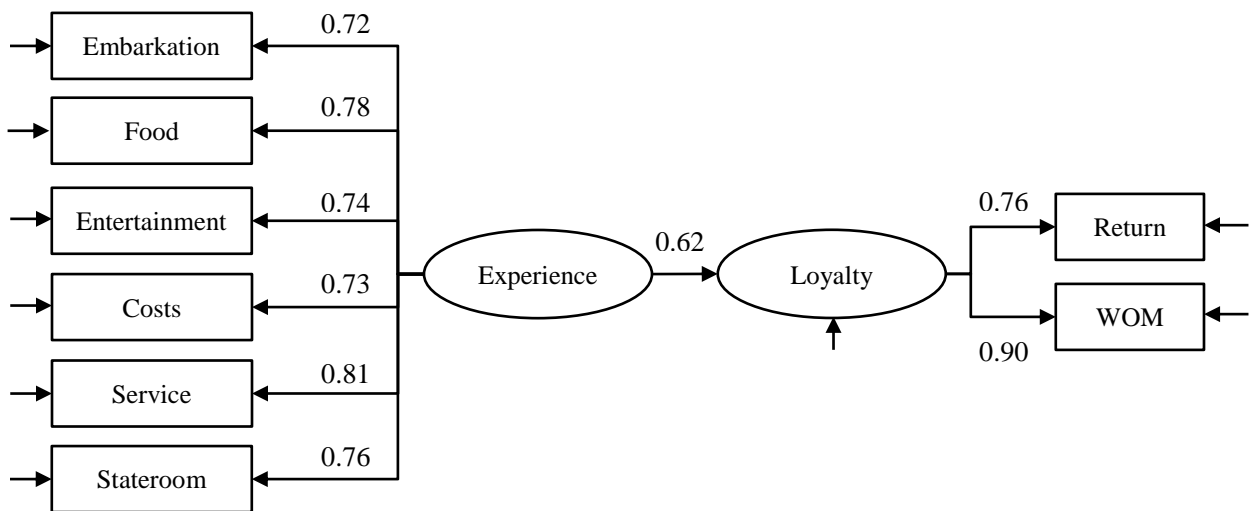
**Table 21: Multivariate Normality Tests**

Data Sets	Skewness			Kurtosis		
	Statistic	Z Score	P Value	Statistic	Z Score	P Value
Low Cluster	7.041	33.741	0.000	113.372	25.744	0.000
Medium Cluster	11.521	38.133	0.000	144.568	26.029	0.000
High Cluster	24.699	26.906	0.000	159.128	15.444	0.000

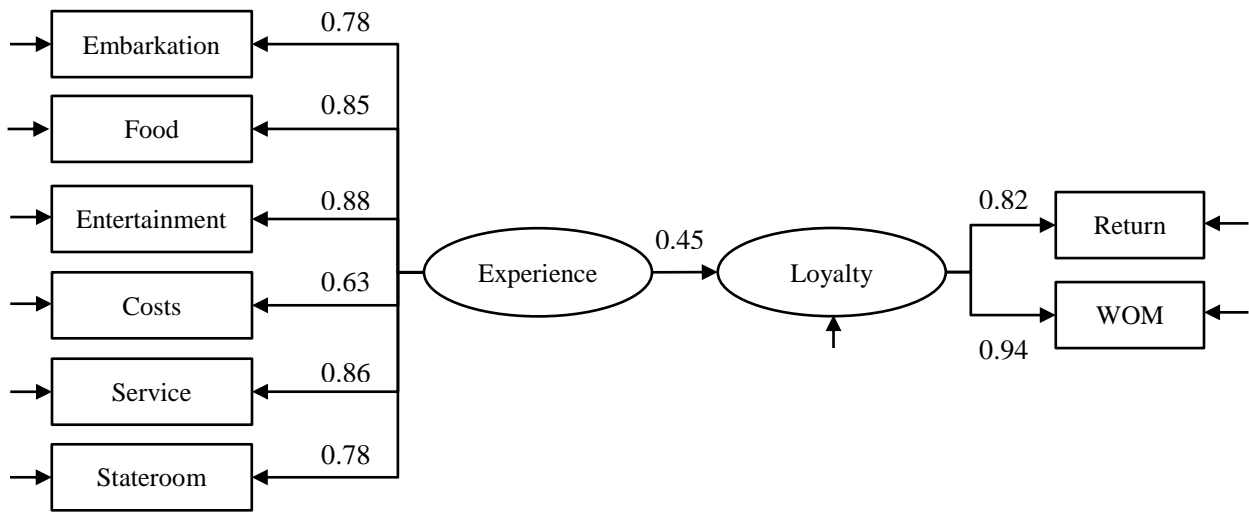
Initial models are shown below from Figure 2 to 4. Two latent variables are involved in the models. Experience is the exogenous latent variable that is measured with six manifest indicators – embarkation experience, food experience, entertainment experience, cost experience, service experience, and stateroom experience. Loyalty is the endogenous latent variable that is measured by return willingness and positive WOM willingness. The models are identifiable as the degrees of freedom of all models exceed 0.



**Figure 2: Initial Structural Regression Model for the Low Cluster**



**Figure 3: Initial Structural Regression Model for the Medium Cluster**



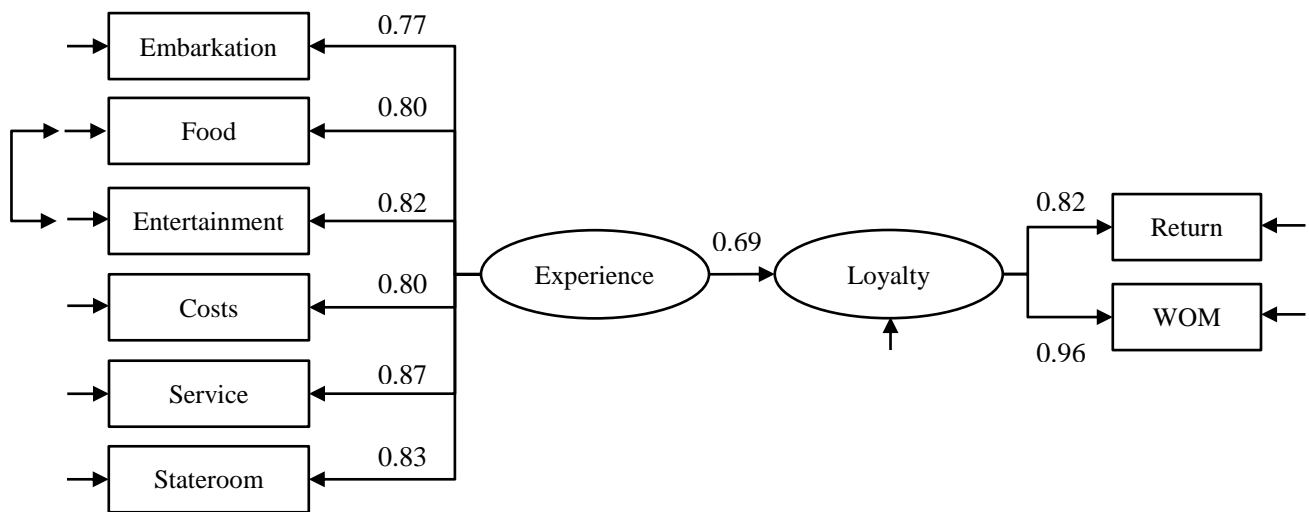
**Figure 4: Initial Structural Regression Model for the High Cluster**

Goodness of fit indices listed in Table 22 find that only the high cluster model fits the data well (Kline, 2009), as the p-value of the  $\chi^2$  test is larger than 0.05, the RMSEA is smaller than 0.05, the lower bound of 90% CI of RMSEA is smaller than 0.05, the upper bound of 90% CI of RMSEA is smaller than 0.10, AGFI is larger than 0.9, and CFI is larger than 0.95. The low and medium cluster models need modification because their p-value of  $\chi^2$  test is below 0.05.

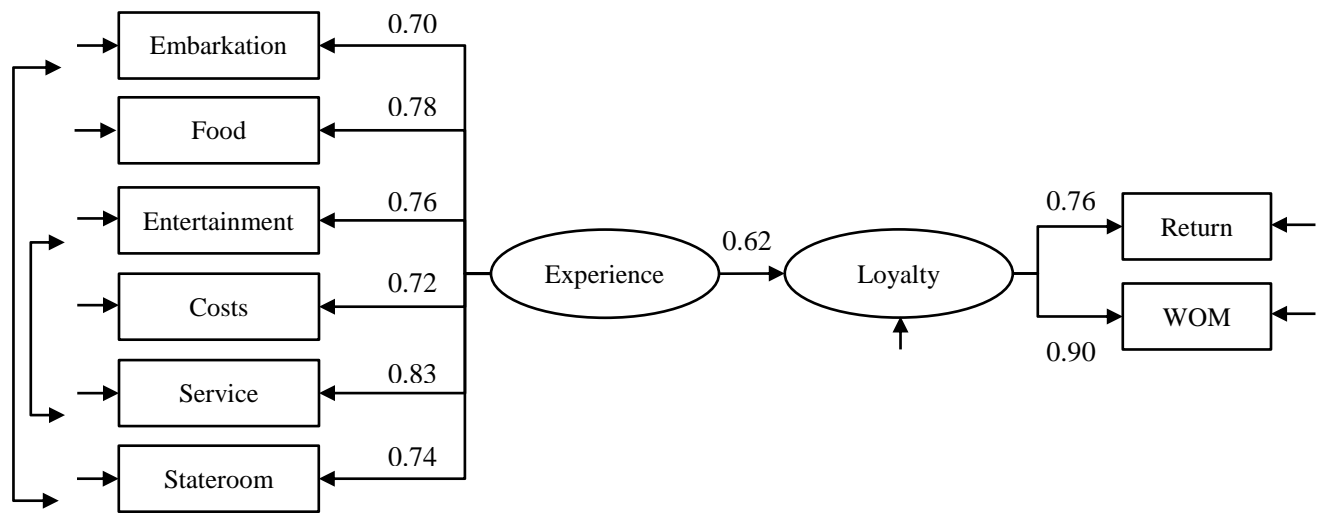
**Table 22: Initial Models' Goodness of Fit**

Models	Goodness of Fit Indexes						
	$\chi^2$	p	$\chi^2/df$	RMSEA	90% CI of RMSEA	AGFI	CFI
Low Cluster	42.29	0.002	2.23	0.029	(0.017, 0.040)	0.96	1
Medium Cluster	48.16	0.000	2.53	0.036	(0.024, 0.049)	0.98	1
High Cluster	20.41	0.370	1.07	0.015	(0.000, 0.053)	0.95	1

For the low cluster model, LISREL suggests adding an error covariance between food and entertainment. This modification is theoretically reasonable, because food experience and entertainment experience are both affected by the service level of staff. The modified model fits the data well. As shown in Table 23, all goodness of fit indicators have met the standards.



**Figure 5: Final Structural Regression Model for the Low Cluster**



**Figure 6: Final Structural Regression Model for the Medium Cluster**

For the medium cluster model, LISREL suggests adding an error covariance between embarkation and stateroom, and another error covariance between entertainment and service. These changes are also reasonable. Entertainment experience and service experience are both related with front line staff service level, while embarkation experience and stateroom experience are both related with backstage staff. As shown in Table 23 as well, the final model for medium cluster also fits the data well.

**Table 23: Final Models' Goodness of Fit**

Models	$\chi^2$	p	$\chi^2/df$	RMSEA	90% CI of RMSEA	AGFI	CFI
Low Cluster	24.45	0.108	1.44	0.017	(0.000, 0.031)	0.97	1
Medium Cluster	23.30	0.140	1.37	0.018	(0.000, 0.034)	0.99	1
High Cluster	20.41	0.370	1.07	0.015	(0.000, 0.053)	0.95	1



With well-fit models, next I analyze the standardized-path weights in the model. From Figure 4, we can see that, for high experience cruise lines, entertainment experience (0.88) is the most important aspect of cruiser experience. Food experience (0.85) and service experience (0.86) are also key factors influencing the overall cruise experience. According to Figure 5, service experience (0.87) is the most important aspect of cruiser experience for low experience cruise lines. Cruisers care about their food (0.80), entertainment (0.82), costs (0.80) and stateroom (0.83) experiences as well. In Figure 6, we can see that cruisers taking medium experience cruise lines form their cruising experience mostly based on their service experience (0.83).

In all final models, positive regression parameter estimates from experience to loyalty suggest that cruiser loyalty is positively related with cruiser experience. However, comparison between models finds that the relationship between experience and loyalty is the strongest in the low cluster model, while weakest in the high cluster model. But this finding does not necessarily suggest that cruisers taking high experience cruise lines are less loyal, as the means of loyalty measures are close across clusters.

## **Discussion and Implication**

Based on customer perceived experience, this study categorizes the seven largest cruise lines in the North America market into three clusters. Carnival, Norwegian, and Princess make up the low experience cluster; Royal Caribbean International, Holland America, and Celebrity are the medium experience cruise lines; Disney is the high experience cruise line. This categorization approach is different from the commonly used categorization method with cruise lines' market positioning strategies (Kwortnik, 2006; CLIA, 2014). It takes the cruise lines' market positioning strategies implementation into account, namely considering cruisers' actual perception. Therefore, the method can better anticipate cruisers' satisfaction and loyalty.

The study also finds that cruising reasons are significantly associated with cruise line clusters. Cruisers in different cruise line clusters are differently affected by price, reputation, past experience, positive review, entertainment, itinerary, sail dates, and casual cruising when they select cruise lines. In detail, cruisers taking low experience cruise lines are more likely to be affected by price, itinerary, sail dates and causal cruising, while those taking high experience cruise lines are easier to be affected by reputation, positive reviews and entertainment. Thus, Carnival, Norwegian, and Princess should design more reasonable prices, better itineraries, more available and appropriate sail dates, and more attractive advertisements or promotions to gain more passengers. Disney, however, should build its brand reputation, encourage its cruisers to

write more positive reviews through online social networks, and design more entertainment activities.

The study also finds that the overall experience of passengers taking low experience cruises is significantly related to the interaction effect between trip length and stateroom size. Larger stateroom size is preferred in short cruise trips, while smaller stateroom size is preferred in long cruise trips. Thus, Carnival, Norwegian, and Princess should care more about the combinations of their trip lengths and stateroom sizes. For short trips less than 5 days, they should design more large rooms that allow more passengers to stay in simultaneously. For long trips more than 5 days, they should design more private rooms. However, for medium and high experience cruise lines, only expense is significantly related to cruiser experience. Cruisers who spend more money on cruise ships have better experience. Thus, Royal Caribbean International, Holland America, Celebrity and Disney should design more entertainment activities to encourage their cruisers to consume more onboard.

Lastly, the study finds that, for low experience cruise lines, service experience, food experience, entertainment experience, cost experience and stateroom experience are all important; for medium experience cruise lines, cruisers care most about their service experience; for high experience cruise lines, entertainment experience, food experience, and service experience are the key factors influencing overall experience. Therefore, service is a common key aspect in

forming cruiser experience. All cruise lines should enhance the reliability, tangibles, responsiveness, assurance and empathy of their services both onboard and off-board. Specifically, they should consider atmosphere and comfort, personalized services, security, knowledgeable and well-trained staff, novel and diverse service items, consistent service level, skillful problem solving, and service failure compensation, etc. (Josiam et al., 2009). For Disney, dining and entertainment experience should be better designed. Food experience can be improved by enhancing the cleanliness of dining facilities, food selection, staff hygiene, menu variety, food quality and special cuisine, etc. (Josiam et al., 2009). By designing more delicate and interesting entertainment activities, entertainment experience can be increased. Carnival, Norwegian, and Princess, also need to consider more about cruiser experience on costs and stateroom. Reasonable prices and appropriate discount promotions should be applied to enhance cost experiences. Room size, room capacity, views, interior designs, balconies, access to bathrooms, and proximity to entertainment facilities all should be well designed to improve the stateroom experience.

## **Limitations**

Although the study revealed implications for the cruising industry, there are a few limitations:.

The survey is conducted by JD Power for business research rather than academic research. Thus, the questionnaire was not designed based on consumer theory. First, as mentioned above, systematic errors exist when measuring excursion experience. Second, the \ variables have different ranges. Variable transformations can reduce information captured by the original variables. Third, the question options are not well-designed, which could lead to common skewness and kurtosis problems. Fourth, although, the measures of cruiser experience and cruise loyalty both display high reliability and convergent validity, the content validity of these two measures is questionable. Better measures for experience and loyalty should be applied instead of creating new measures without testing construct validity. Lastly, no demographics questions are involved in the survey. Underlying systematic biases may exist and lead to bad representativeness.

As mentioned above, insufficient sample size is another limitation of this study. The structural equation models require more observations for stable and robust estimates. As suggested by LISREL, each cluster approximately needs 300 more cases. Unbalanced subsample size is

another limitation. Only 314 observations are involved in high experiential cruise lines cluster, while the other clusters both contain over 1000 cases. Standard errors are usually inflated with large samples. Thus, the difference between clusters may due to different standard errors.

In the multiple regression models, the R square values are small, illustrating that little variance of the outcome variable can be explained by the models. This problem may be raised as only three predictors are involved. Many related covariate may be missing, making the models less robust.

Finally, there are only seven cruise lines involved in this study, although they have good representativeness. Only Disney is defined as high experience cruise line, making it hard to find common characteristics for this cluster. More cruise lines should be involved in future studies.

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## **Appendix: Survey Questionnaire**

Q1: Which cruise line did you travel on? (If you have taken more than one, please select the cruise line most recently taken.)

[Please select one response]

01. Aida Cruises [Terminate]

02. Azamara Club Cruises [Terminate]

03. Carnival Cruise Line

04. Celebrity Cruise Line

05. Costa Cruise Line [Terminate]

06. Crystal Cruises [Terminate]

07. Cunard Line [Terminate]

08. Disney Cruise Line

09. Holland America Line

10. MSC Italian Cruises [Terminate]

11. Norwegian Cruise Line

12. Oceania Cruises [Terminate]

13. Princess Cruises

14. Regent Seven Seas Cruises [Terminate]

15. Royal Caribbean International

16. Seabourn Cruise Line [Terminate]
17. SeaDream Cruise Line [Terminate]
18. Silversea Cruises [Terminate]
19. Windstar Cruises [Terminate]
20. Other (please specify):\_\_\_\_\_ [Terminate]

Q2: In which month did you go on your cruise with [Insert Q1 response]?

01. April 2012
02. May 2012
03. June 2012
04. July 2012
05. August 2012
06. September 2012
07. October 2012
08. November 2012
09. December 2012
10. January 2013
11. February 2013
12. March 2013

Q3: How many days was your cruise with [Insert Q1 response]

- 01. 3 days
- 02. 4-5 days
- 03. 6-9 days
- 04. 10 or more days

Q4: Including yourself, how many people were in your stateroom?

\_\_\_\_ Number of people (range from 1 to 15)

Q5: How did you become aware of [Insert Q1 response] when selecting it for your cruise?

- 01. Travel agent
- 02. Cruise line official website
- 03. Promotional material received directly from [Insert Q1 response]
- 04. Other website
- 05. Friends or family
- 06. TV
- 07. Radio/magazine/newspaper advertisement
- 08. Cruised with this line before
- 09. Other (please specify): \_\_\_\_\_

Q6: How did you book your [Insert Q1 response] [Insert Q2 response] cruise?

01. [Insert Q1 response] website

02. An online service

03. Travel agent

04. Toll-free reservation line

05. Other

Q7: Why did you select [Insert Q1 response] as the cruise line you most recently traveled on?

[Please select all that apply]

01. Price

02. Brand reputation

03. Past experience with brand

04. Positive review (e.g. award or online rating)

05. Availability

06. Entertainment

07. Recommendation

08. Itinerary

09. Sail dates

10. Casual cruising

11. Length of trip

12. Others (please specify): \_\_\_\_\_

Q8: How much did you spend on the cruise (for all parties in your stateroom)? Exclude any charges incurred during the cruise itself.

\$\_\_\_\_\_ (range 1-10000)

Q9: Did the [Insert Q7 response] include a return flight to your home city for all parties in your stateroom?

01. Yes

02. No

99. Don't know

Q10: Thinking about your most recent cruise with [Insert Q1 response], did you contact [Insert Q1 response] for a question, problem or request before your cruise?

01. Yes

02. No

99. Don't know

[If *Yes* in Q10, then Q11]

Q11: Did you receive a response to your question?



01. Yes

02. No

99. Don't know

[If *Yes* in Q11, then Q12]

Q12: Was the response helpful?

01. Yes

02. No

99. Don't know

Q13: How many problems did you experience on your [Insert Q1 response]?

\_\_\_\_\_ Number of problems (range from 0 to 100)

Q14: Did you take on any excursions on your [Insert Q1 response]?

01. Yes

02. No

[Q15-Q21] What you like and don't like about your cruise line?

Please rate your experience with your [Insert Q1 response] on the following items using a scale of 1 to 10, where 1 is Unacceptable, 5 is Average, and 10 is Outstanding.

Q15: How would you rate your overall experience with getting on and off the ship during the cruise? This would include embarkation, using the gangway or tenders to access the ports as well as disembarkation.

Q16: How would you rate your overall experience with the food on [Insert Q1 response]? This would include main dining rooms, buffet, room service, etc.

Q17: How would you rate your overall entertainment experience on [Insert Q1 response]? This would include the various amenities, professional entertainment, organized cruise staff activities, etc.

Q18: Thinking of all costs including the initial reservation price and any charges incurred during the cruise itself, how would you rate your overall cost of [Insert Q1 response] experience?

Q19: How would you rate your overall service provided by all with [Insert Q1 response] representatives, staff and crew, both on the ship as well as before and after your cruise?

[If *Yes* in Q14, then Q20]

Q20: How would you rate your overall excursions experienced on [Insert Q1 response]? This would include competitiveness of price, amount of time spent sightseeing, transportation from

cruise and back, etc.

Q21: How would you rate the overall stateroom experience of [Insert Q1 response]?

Q22: Taking everything into account, how would you rate your overall experience on your recent [Insert Q1 response]?

Q23: How likely are you to take another cruise with [Insert Q1 response]?

01. Definitely will not

02. Probably will not

03. Probably will

04. Definitely will

99. Don't know

Q24: How likely are you to recommend [Insert Q1 response] to friends, relatives or colleagues?

01. Definitely will not

02. Probably will not

03. Probably will

04. Definitely will

99. Don't know